

Application No. 10/064,791
Docket No. 13DV-13975
Amendment dated February 4, 2004
Reply to Office Action of November 4, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1-25 (canceled)

Claim 26 (currently amended): A thermal barrier coating on a surface of a component, the thermal barrier coating comprising a thermal-insulating material in which is contained elemental carbon and/or a gas that is insoluble in the thermal-insulating material, the elemental carbon and/or insoluble gas being entrapped within pores that are within grains and at and between grain boundaries of the thermal-insulating material, the entrapped elemental carbon and/or the insoluble gas being present substantially throughout the thermal-insulating material in an amount sufficient to thermally stabilize the microstructure of the thermal-insulating material.

Claim 27 (original): A thermal barrier coating according to claim 26, wherein at least some of the pores contain the elemental carbon.

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Claim 28 (original): A thermal barrier coating according to claim 26,
wherein at least some of the pores entrap the insoluble gas.

Claim 29 (original): A thermal barrier coating according to claim 28,
wherein the insoluble gas is at least one gas chosen from the group consisting of carbon monoxide, carbon dioxide, sulfur dioxide, nitrogen and argon.

Claim 30 (original): A thermal barrier coating according to claim 26,
wherein at least some of the pores contain the elemental carbon and at least some of the pores entrap the insoluble gas, the insoluble gas being a carbon-containing gas.

Claim 31 (original): A thermal barrier coating according to claim 26,
wherein the microstructure of the thermal barrier coating comprises columnar grains.

Claim 32 (original): A thermal barrier coating according to claim 26,
wherein the thermal-insulating material is predominantly yttria-stabilized zirconia.

Claim 33 (original): A thermal barrier coating according to claim 26,
wherein the thermal barrier coating has an open porosity level of at least 25 volume percent.

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Claim 34 (currently amended): A thermal barrier coating on a surface of a superalloy component, the thermal barrier coating comprising:

a bond coat on the component;
a thermal-insulating material having a columnar microstructure with pores and sub-grain interfaces within, at and between grain boundaries of the microstructure, at least some of the pores throughout the thermal-insulating material entrapping containing elemental carbon and/or a carbon-containing gas to resist sintering, grain coarsening and pore redistribution within the thermal-insulating material and thereby thermally stabilizing the microstructure.

Claim 35 (original): A thermal barrier coating according to claim 34, wherein the thermal-insulating material is yttria-stabilized zirconia.

Claim 36 (original): A thermal barrier coating according to claim 34, wherein at least some of the pores entrap the carbon-containing gas.

Claim 37 (original): A thermal barrier coating according to claim 36, wherein the entrapped carbon-containing gas is carbon monoxide.

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Claim 38 (original): A thermal barrier coating according to claim 34, wherein the thermal barrier coating has an open porosity level of at least 25 volume percent.

Claim 39 (new): A thermal barrier coating on a surface of a component, the thermal barrier coating comprising a thermal-insulating material in which is contained elemental carbon, the elemental carbon being entrapped within pores that are within grains and at and between grain boundaries of the thermal-insulating material, the elemental carbon being present in an amount sufficient to thermally stabilize the microstructure of the thermal-insulating material.

Claim 40 (new): A thermal barrier coating according to claim 39, wherein at least some of the pores entrap a carbon-containing gas that is insoluble in the thermal-insulating material.